

Supplementary Materials

for

Lake heat storage change based evaporation quantifying of middle-large lakes in the inland of the Tibet plateau and their temporal and spatial variations

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In this paper, the middle-large lakes in the inland of the Tibetan Plateau (TP) are defined as the lakes with water surface area greater than 50 km². The lake area data of TP was obtained from Zhang et al (2019) [1] and available in Tibetan Plateau Scientific Data Center. As shown in Fig. S1 (a), from 1979 to 1995, the number of middle-large lakes in the studied area decreased from 104 to 99, and the total area decreased from 21055.91 km² to 19898.80 km². After 1995, both the number and the total area showed significant increase trend. For the area ratios of different lake groups, Fig. S1 (b) shows that in 2018 S06 region had the largest total lake area with annual average area is 7693.32 km², accounting for 30.73% of the total area of the middle-large lakes in the studied region while S01 region had the least total lake area with 1441.17 km², only accounting for 5.76%. The time series changes of lake area in each lake group have similar characteristics to the overall lake area changes (Fig. S1 (c)). Among them, S03 region had the fastest expansion rate with about 104.43 km²/year, and S05 region had the slowest expansion rate with only 7.04 km²/year. For the 142 middle-large lakes in 2018, there are 114 lakes showing an upward trend and 28 lakes showing a down trend in lake water area (Fig.S1 (d)).

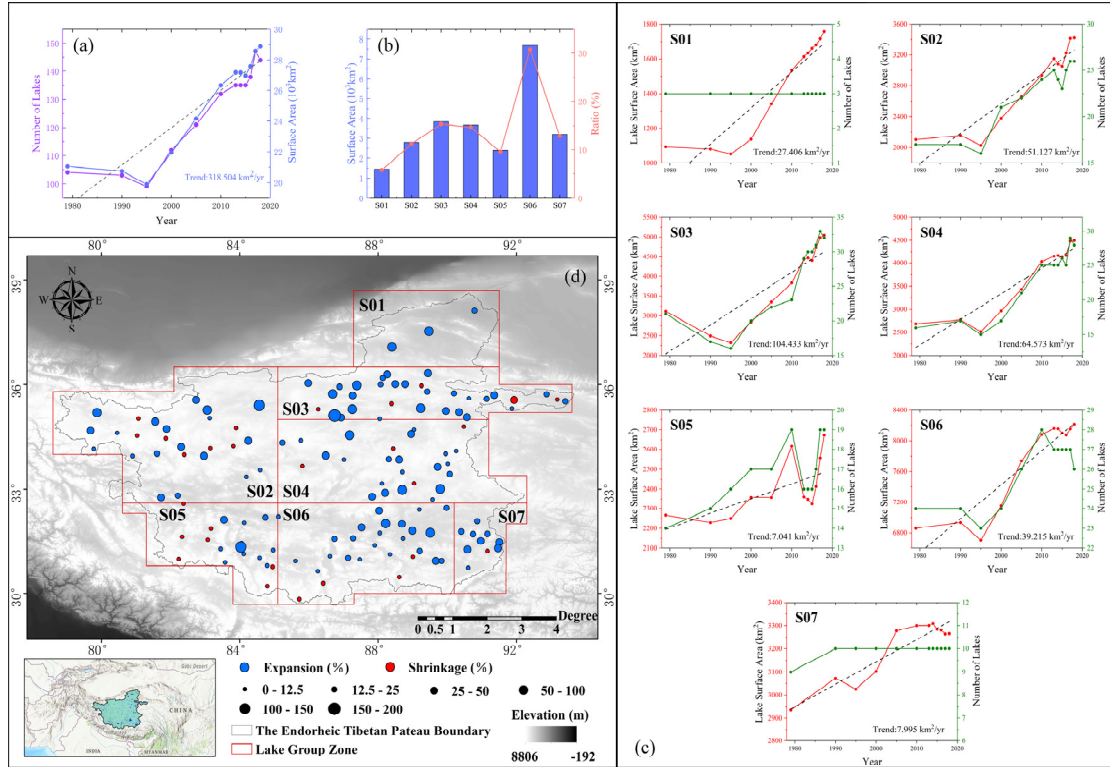


Figure. S1 Variation of the total area of the middle-large lakes in the inland of the TP from 1979 to 2018 (a); lake surface area of 7 lake groups in 2018 (b); variation of lake area of 7 lake groups from 1979 to 2018 (c) and variation trends in the area of each middle-large lakes from 1979 to 2018 (d). Ratio indicates the proportion of the lake area of a certain lake group to the total middle-large lake area of the studied region. Relative change in trend (%) of a certain lake is calculated from dividing its absolute variation trend by the average surface area of the corresponding lake.

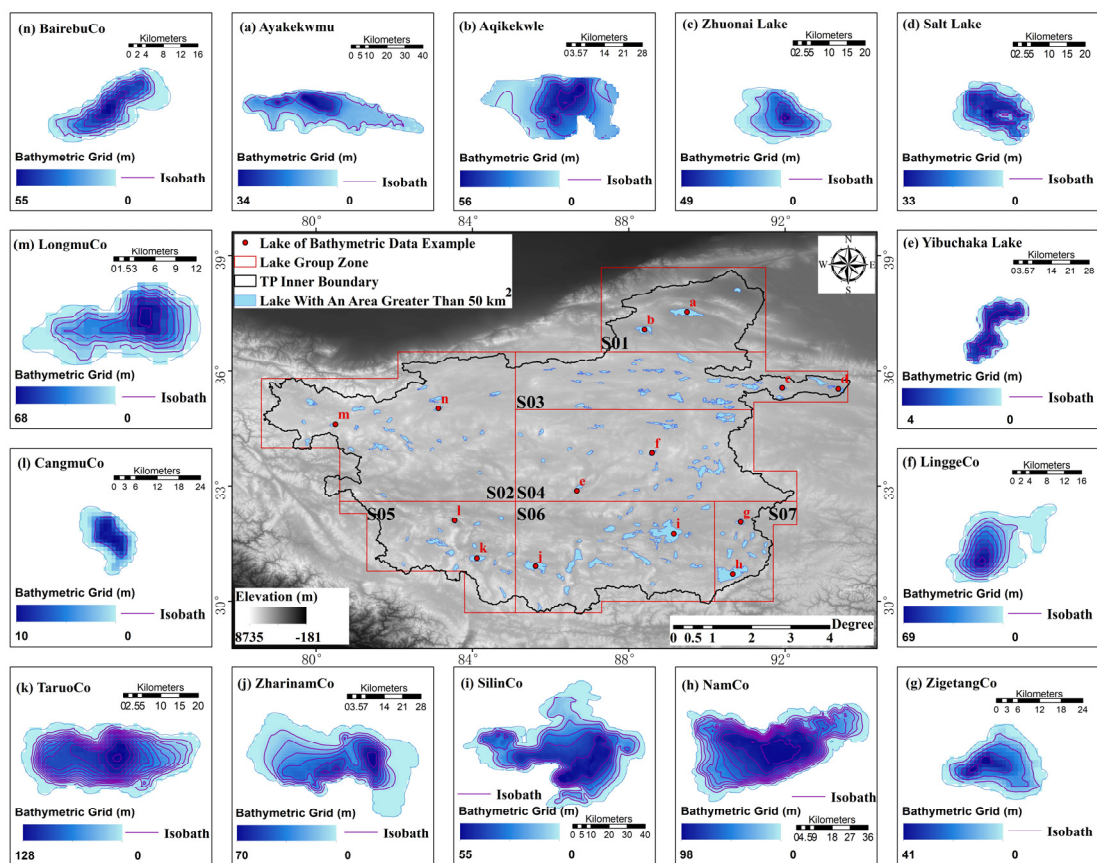


Figure. S2. The bathymetric maps of the 14 example lakes. (a, Ayakekwmu; b, Aqikekwle; c, Zhuonai Lake; d, Salt Lake; e, Yibuchaka Lake; f, LinggeCo; g, ZigetangCo; h, NamCo; i, SilinCo; j, ZharinamCo; k, TaruoCo; l, CangmuCo; m, LongmuCo; n, BairebuCo)

Table. S1. Detail information of all 134 middle-large-sized lakes

Zone	No	Name	Lat	Lon	Average depth (m)	Max depth (m)
S1	1	Gascwle_Lake	38.1225	90.7890	/	/
S1	2	AyakekwmuCo	37.5460	89.4925	11	37.32
S1	3	Aqikekwle_Lake	37.0771	88.4027	18	56.12
S2	4	Yang_Lake	35.4276	84.6496	/	/
S2	5	Xin_Lake	34.3931	84.2468	/	/
S2	6	ChaboCo	33.3622	84.1918	/	/
S2	7	Wanquan_Lake	34.2399	83.8143	/	/
S2	8	Heishibei_Lake	35.5600	82.7411	27	69.59
S2	9	Jianshui_Lake	35.2998	83.1367	/	/
S2	10	BairebuCo	35.0345	83.1308	22	55.92
S2	11	TuohepingCo	34.1839	83.1421	/	/
S2	12	ChangtiaoCo	33.9554	82.9655	/	/
S2	13	MeimaCo	34.2183	82.3065	/	/
S2	14	AluCo	33.9458	82.4144	/	/
S2	15	Dulishi_Lake	34.7325	81.8858	14	42.65

S2	16	Qingche_Luotuo_Lake	34.4370	81.9437	/	/
S2	17	LumajiangdongCo	34.0200	81.6116	16	35.90
S2	18	AwengCo	32.7653	81.7239	/	/
S2	19	BangdaCo	34.9444	81.5573	18	47.65
S2	20	GuozaCo	35.0160	81.0000	58	149.54
S2	21	WoerbaCo	34.5346	81.0362	/	/
S2	22	Jiezechaka	33.9540	80.9027	16	33.93
S2	23	LongmuCo	34.6189	80.4935	40	69.88
S2	24	Akesaiqin_Lake	35.2012	79.8706	9	29.07
S2	25	Salijilegannankule	34.6812	79.6875	/	/
S2	26	ZeCo	34.1589	79.7787	/	/
S3	27	Changhong_Lake	36.0367	85.9793	/	/
S3	28	ZhenquanCo	35.9254	86.9876	/	/
S3	29	YongboCo	35.7351	86.6925	/	/
S3	30	Xuejing_Lake	35.9850	87.3829	/	/
S3	31	Deyu_Lake	35.6884	87.2648	/	/
S3	32	Maergaichaka	35.1217	86.7299	/	/
S3	33	Jiangnichaka	35.0504	86.9482	/	/
S3	34	Xuemei_Lake	36.2833	88.2578	/	/
S3	35	Yinbo_Lake	36.1900	88.1362	/	/
S3	36	Xianhe_Lake	35.9955	88.0914	/	/
S3	37	Yuye_Lake2	36.0190	88.4139	/	/
S3	38	Yuye_Lake	36.0124	88.7825	/	/
S3	39	RuolaCo	35.4107	88.3462	/	/
S3	40	Danshui_Lake	35.4580	88.4791	/	/
S3	41	Jingyu_Lake	36.3299	89.4417	13	41.55
S3	42	Weishan_Lake	35.9285	89.2238	/	/
S3	43	Xiangyang_Lake	35.8025	89.4205	/	/
S3	44	DuogecorenqiangCo	35.3222	89.2361	6	21.96
S3	45	Lexiewudan_Lake	35.7517	90.1942	/	35.73
S3	46	Yinma_Lake	35.6020	90.5684	/	/
S3	47	Yonghong_Lake	35.2177	89.9822	/	/
S3	48	Xijinwulan_Lake	35.2140	90.3394	5	26.38
S3	49	Yanjing_Lake	35.0723	90.4981	/	/
S3	50	Kekexili_Lake	35.5876	91.1392	12	42.04
S3	51	Kekao_Lake	35.6938	91.3617	/	/
S3	52	Zhuonai_Lake	35.5566	91.9303	14	56.65
S3	53	Codarima	35.3199	91.8690	/	/
S3	54	Kusai_Lake	35.7259	92.8723	/	/
S3	55	Haidingnuoer	35.5801	93.1774	/	/
S3	56	Yan_Lake	35.5279	93.3617	14	36.30
S4	57	LaxiongCo	34.3394	85.2312	16	44.52
S4	58	BuruoCo	34.4248	85.7849	43	100.55

S4	59	GemuCo	33.6649	85.8114	/	/
S4	60	Gaerkongchaka	33.9676	86.4870	/	/
S4	61	CoNi	34.5048	87.1596	/	/
S4	62	Maerguochaka	33.8567	87.0129	/	/
S4	63	Yibuchaka	32.8767	86.6722	2	5.05
S4	64	Chang_Lake	34.7135	89.0407	/	/
S4	65	Duogecoren	34.5823	88.9671	6	49.50
S4	66	LongweiCo	33.8667	88.3092	4	100.00
S4	67	LinggeCo	33.8524	88.5992	27	73.65
S4	68	Daerwocowen	33.5502	88.7079	/	/
S4	69	AmuCo	33.4462	88.6901	/	/
S4	70	Chaiduochaka	33.1637	88.9878	5	15.91
S4	71	Eyacuqiong	32.9822	88.6979	8	24.88
S4	72	PengyanCo	32.8942	88.2015	3	5.68
S4	73	PaduCo	32.7915	87.8275	7	16.16
S4	74	Wulanwula_Lake	34.7382	90.6231	11	64.60
S4	75	Xuelian_Lake	34.0944	90.2571	/	/
S4	76	Botao_Lake	34.0130	89.9536	/	/
S4	77	LaoriteCo	33.7261	90.0124	/	/
S4	78	MeiriqieCo	33.6481	89.7337	/	/
S4	79	DuoersuodongCo_Chib uzhangCo	33.4351	90.0685	22	116.33
S4	80	YagenCo	33.0220	89.8061	3	6.67
S4	81	AngdaerCo	32.7073	89.5754	4	7.75
S5	82	ConaCo	31.6534	82.3515	/	/
S5	83	AguoCo	30.9838	82.2366	/	/
S5	84	GuopuCo	31.8555	83.1750	/	/
S5	85	AnglarenCo	31.5420	82.9604	19	75.20
S5	86	CangmuCo	32.1164	83.5450	4	10.94
S5	87	RenqingxiubuCo	31.2779	83.4480	29	71.07
S5	88	PalongCo	30.8971	83.5786	/	/
S5	89	LaguoCo	32.0281	84.1292	16	34.36
S5	90	ZhabuyeCo	31.4451	84.0552	/	/
S5	91	TaruoCo	31.1380	84.1161	61	132.09
S5	92	DongCo	32.1801	84.7403	2	5.00
S5	93	DawaCo	31.2427	84.9637	17	43.32
S5	94	QuyiCo	31.0217	84.5772	/	/
S5	95	DibuCo	30.7962	84.8251	/	/
S5	96	GarenCo	30.7809	84.9770	7	21.87
S5	97	JiesaCo	30.1560	84.8357	/	/
S6	98	ZharinanmuCo	30.9278	85.6148	21	71.55
S6	99	DajiaCo	29.8386	85.7387	21	55.64
S6	100	DangqiongCo	31.5686	86.7393	/	/

S6	101	DangreyongCo	31.2280	86.6741	84	214.48
S6	102	MuCoBingni	30.6025	86.3085	30	130.46
S6	103	XuruCo	30.2943	86.4140	109	220.00
S6	104	ReermaCo	32.4074	88.0662	8	21.00
S6	105	JiarebuCo	32.1988	87.7780	/	/
S6	106	DazeCo	31.8947	87.5244	17	45.30
S6	107	GemangCo	31.5839	87.2782	18	53.41
S6	108	AngziCo	30.9793	87.0554	1/	20.67
S6	109	MaerxiaCo	30.9920	87.4084	5	20.21
S6	110	SaibuCo	32.0037	88.2190	7	12.23
S6	111	WuruCo	31.7173	88.0014	38	85.64
S6	112	ZiguiCo	31.3747	87.9019	/	/
S6	113	GerenCo	31.2169	88.1743	28	75.00
S6	114	YueqiaCo	30.4690	88.6136	7	21.33
S6	115	GuogenCo	32.4037	89.1915	/	/
S6	116	BengzeCo	31.9921	88.6880	/	/
S6	117	SilinCo	31.7691	89.1542	23	56.31
S6	118	Coe	31.5947	88.7732	10	39.68
S6	119	GuomangCo	31.2186	89.2022	16	40.10
S6	120	MujiuCo	31.0425	89.0188	1	5.00
S6	121	QixiangCo	32.4494	89.9783	11	27.73
S6	122	BangeCo	31.7168	89.4746	/	/
S6	123	RenCo	30.9318	89.6674	/	/
S6	124	DuoqiongCo	30.9315	89.8339	/	/
S7	125	ZigetangCo	32.0766	90.8645	16	47.60
S7	126	DongqiaCo	31.7770	90.4040	/	/
S7	127	DaruCo	31.7019	90.7430	26	20.58
S7	128	DungCo	31.7091	91.1598	8	34.94
S7	129	PungCo	31.5043	90.9685	18	59.52
S7	130	CoNagoin	31.4712	91.5050	4	8.44
S7	131	BamCo	31.2645	90.5832	21	72.56
S7	132	BengCo	31.2193	91.1637	35	75.32
S7	133	NairipunCo	31.3000	91.4660	9	32.82
S7	134	NamCo	30.7211	90.6616	48	98.85

References:

- [1]. Zhang G, Luo W, Chen W, Zheng G. A robust but variable lake expansion on the Tibetan Plateau. Science Bulletin. 2019;64(18):1306-1309.